

Chapter 13

Organic Wastes

Introduction

In Clark County, organic wastes comprise one of the single largest recyclable components of the disposed waste stream. A separate chapter on *Organic Wastes* highlights the role that organic wastes diversion could play during the next five-year planning period and provides a structure for the County to take a proactive approach in addressing potential issues.

Included in this chapter are estimates of the quantity of organic wastes disposed of, reviews of applicable regulations, an examination of the types of organic wastes processing technologies, and discussions on the need to encourage proper organic wastes handling and storage to improve water quality and salmon recovery efforts, as well as marketing the end product of composting.

The types of organic wastes addressed in this chapter include: **Yard Debris, Food Waste, Land Clearing Debris, Biosolids and Agricultural Waste**. (Wood waste is also addressed in the *Construction & Demolition* chapter.) For each type of organic wastes, the existing conditions are documented, needs and opportunities are discussed and alternatives are presented.

Definitions

Composting is defined in Chapter 173-304 WAC, Minimum Functional Standards for Solid Waste Handling as: a biological process requiring “the controlled degradation of organic solid waste, yielding a product for use as a soil conditioner.”

Type 1 feedstocks are defined by the Compost Facility Resource Handbook as: wood waste, source separated yard and garden wastes, agricultural crop residues, manure from herbivorous animals, pre-consumer meat-free food waste, and other source separated specialty waste that the jurisdictional health department considers to be relatively low in hazardous substance, human pathogens and physical contaminants.

Type 2 feedstocks are defined by the Compost Facility Resource Handbook as: biosolids, wastewater treatment solids, septage, meat and post-consumer source separated food waste, and other source separated specialty waste that the jurisdictional health department considers to be relatively low in hazardous substance and physical contaminants, but are likely to have high levels of human pathogens.

State Legislation, Regulations and Guidelines

Unlike some other states, Washington does not have a separate regulation dedicated to compost facilities. Regulations for compost facilities are addressed by:

- Solid Waste – permitting handling facilities
- Water Quality – stormwater runoff, leachate
- Air Quality – odor issues
- Land Use – siting issues

In addition to these areas of regulation, other state, local and federal requirements may apply to a facility depending on its location and construction plans. Under the State's water quality regulations, compost pads are required for active composting and curing areas of all facilities regardless of feedstocks in areas of the state with wet climates. Leachate collection ponds must have liners to protect groundwater. An organics processing facility must be permitted as a solid waste handling facility; it can get a recycling facility permit under WAC 173-304-300 for non-containerized composting in piles. Yard debris and food wastes are regulated as part of solid waste; biosolids and agricultural waste are regulated by other regulations. Once compost has been processed and meets either one of the grades of quality recommended in the Interim Guidelines for Compost Quality, it is no longer considered solid waste. Table 13-1 outlines various regulations and who enforces them.

State Regulations

Minimum Functional Standards for Solid Waste Handling (MFS), Chapter 173-304 WAC, contains two sections that address composting based on the feedstocks processed: Section 300, Waste Recycling Facility Standards, and Section 420, Piles Used for Storage and Treatment - Facility Standards. In Washington State, jurisdictional health departments are responsible for permitting compost facilities under the Minimum Functional Standards and have the authority to decide under which standards, or combination of standards, compost facilities should be regulated. Other sections of WAC 173-304 apply as well such as 600,405 and 407. Certain elements of the 420 standards also apply but would more stringently be required if food, garbage or biosolids were also used as primary or secondary feed stocks or if more than 10K cubic yards of leachate generating material were being processed at any one time. These permits are supplemental to their pre-existing solid waste handling operation permits.

State Waste Discharge Permit (Chapter 173-216 WAC) must be obtained if leachate is discharged to ground water or to a municipal sewage treatment plant.

National Pollutant Discharge Elimination System Permit (NPDES) must be obtained if industrial wastewater (leachate) is discharged to any surface water. The leachate must be treated prior to discharge according to All Known, Available, and Reasonable Methods of Prevention and Treatment (AKART). (Chapter 173-220 WAC). As part of the **NPDES** permit application, an engineering report needs to be submitted to the Department of Ecology which describes the leachate treatment options and disposal. (Chapter 173-240 WAC).

General Regulations for Air Pollution Sources was issued by the Department of Ecology in Chapter 173-400 WAC. These regulations work to control and/or prevent the emission of air contaminants statewide. The Southwest Washington Air Control Authority is responsible for enforcing this regulation.

Washington State Biosolids Management Rule (Chapter 173-308 WAC) applies to compost facilities handling biosolids. Like its federal counterpart, 40 CFR Part 503, the biosolids rule is self-implementing. This means that the basic requirements of the rule must be met regardless of the permit status of a facility. The state biosolids rule was adopted in February 1998 and gave regulatory authority to the Department of Ecology.

State Environmental Policy Act, Chapter 197-11 WAC applies to all new compost facilities during the permit application to an agency. All solid waste handling permits require SEPA review, which includes an environmental checklist.

Table 13-1.	
State Regulations Applicable To Organics Compost Facilities	
State Regulation	Who Enforces The Regulation
Chapter 173-304 WAC, Minimum Functional Standards for Solid Waste Handling (MFS)	Southwest Washington Health District
Chapter 173-216 WAC, State Waste Discharge Permit Program	Department of Ecology – Water Quality Program
Chapter 173-220 WAC, National Pollutant Discharge Elimination System Permit Program	Department of Ecology – Water Quality Program
Chapter 173-240 WAC, Submission of Plans and Reports for Construction of Water Facilities	Department of Ecology – Water Quality Program
Chapter 173-400 WAC, General Regulations for Air Pollution Sources	Southwest Washington Air Pollution Control
Chapter 173-308 WAC, Biosolids Management	Department of Ecology
Chapter 197-11 WAC, State Environmental Policy Act	Lead agency responsible for SEPA compliance

Background

What organic materials are being discarded?

Based on a 1995 Waste Stream Analysis, compostable organic wastes accounts for almost twenty percent of all waste received at the Clark County transfer stations (11.9% food scraps, 4.1% yard waste and 1.6% land clearing – percentages by weight). Table 13-2 shows a breakdown by material type of how much is discarded each year.

Table 13-2 Clark County Organic Wastes Disposal Estimates*	
Organic Material	Amount Disposed At Transfer Stations
Yard debris	9,225 tons
Food waste residential	16,600 tons
Food waste commercial	10,100 tons
Land clearing debris	3,600 tons
* Based on 1995 Clark County, WA – waste stream analysis.	

Most wood waste and land clearing debris is diverted to the wood waste processing facilities or ground on site. This is due to lower disposal costs to process wood waste into fuel rather than to sending it to the landfill.

Composting Facilities

Currently two organic wastes composting facilities are permitted in Clark County. The West Van Materials Recovery facility is permitted to handle Type 1 feedstocks. West Van is capable of processing an estimated 20,000 tons of material per year. H&H Wood Recyclers is permitted to compost small amounts of Type 1 feedstocks, however the majority is transported to another location for composting.

It is important to note that at this time no processing facility exists to process Type 2 feedstocks.

What has been accomplished 1994-present?

Urban Area yard debris collection was implemented in June, 1994

During 1998 approximately 17,000 customers subscribed to the yard debris program or 29% of the total number of eligible households (59,000).

Approximately 17,000 tons of yard debris was collected at the curb during 1998. (At least 41% was composted, the remainder was used as hogfuel.)

Formed the Organic Recycling Group, which meets regularly to share information and partner in solutions.

Established an annual fall leaf collection program.

Participated in annual collection of Christmas Trees.

Promoted chipping events to Neighborhood Associations.

- Four local Safeway stores began participating in a Portland/Vancouver metro area food waste pilot project.
- Implemented a pilot project to compost biosolids using vermiculture.

Discussions of Organic Wastes

The following sections provide a brief discussion for each organic type of material. Existing conditions are documented, needs and opportunities are reviewed and alternatives are presented.

Existing Conditions – Yard Debris

Residential Yard Debris

Yard debris is different from other recyclable materials in that it can be managed and used at home by residents. The County actively promotes home composting and grasscycling as a waste reduction method as described in the chapter on *Waste Reduction*. Home composting avoids the economic and environmental costs of operating collection systems and centralized processing facilities. However, not all residents have the ability or desire to compost their yard debris and/or other organic wastes at home. For those residents, collection services may play a role. Yard debris is a well-defined component of the waste stream and is easily handled by existing collection equipment. Yard debris collected in Clark County is currently either composted in relatively low cost open windrows at one of several yard debris composters in the Clark County/Portland Metro area or used as a source of fuel in industrial burners.

All single-family residences within the County's defined Urban Growth Area have yard debris collection available. In Clark County, participants subscribe and pay directly for yard debris collection. Yard debris is collected in wheeled carts, with extra quantities handled in bags or marked containers. Waste Management Inc. (WMI) is the contracted service provider serving the Greater Vancouver and Battle Ground areas at a rate of \$6.02 per month (the rate within the City of Vancouver is \$5.74) for weekly collection of a 64-gallon cart and up to one additional 32-gallon can or Kraft paper bag. WMI holds the contract with urban county households through July 31, 2002 and City of Vancouver households through July 31, 2006 with the possibility of two one-year extensions. Evergreen Waste Systems, a Waste Connections company, serves the Camas/Washougal area at a fee of \$5.25 per month for every-other-week collection of one 90-gallon cart. This collection schedule is maintained throughout the year and the contract runs through April 10, 2005. The prices for collection are based on 1999 charges and are annually adjusted for inflation.

Approximately 17,000 residences or 29% of the 59,000 urban service area single-family residences subscribe to yard debris collection. Approximately 17,000 tons (40,000 cubic yards) of yard debris was collected in 1998, equal to approximately 170 pounds per subscriber per month. This recovery rate does not necessarily equal per-household recovery, because neighbors may combine their yard waste under one subscription. The remaining urban residences use backyard composting to manage these materials, dispose of yard debris in their garbage or self-haul to composting facilities. A 1997 County survey of 327 residents indicated that 52% compost at home, 10% dispose of yard debris in their garbage, 19% use curbside yard debris services, 10% said they had no yard debris and the remainder gave other responses. Some yard debris may be burned or dumped illegally.

Residents with large quantities of yard debris, such as branches, may self-haul their materials. The West Van Materials Recovery Center (West Van) has recently expanded their handling capabilities and accepts source-separated yard debris at a tipping fee of \$48.00 per ton. West Van's seven-acre composting area is permitted to receive Type 1 feedstock. Central Transfer and Recovery, H&H Wood Recyclers, Inc., McFarlane's Bark and Triangle Resources all accept yard debris for prices that range from \$5.00 to \$6.00 per yard. These sites compost, process and/or transfer yard debris on their respective sites.

The County offers free leaf drop-off to encourage residents to collect leaves and take them to a permitted facility to be turned into compost. The intent of the program is to keep leaves from clogging storm drains and catch basins, which cause flooding and labor costs to unplug drains and basins. This program is jointly run with the City of Vancouver Public Works Department. Coordination keeps down costs and demonstrates government efficiency by working together. A coupon must be presented to qualify for free drop-off. County coupons are currently distributed through sewer bills, which is coordinated with Hazel Dell Sewer District. City of Vancouver leaf coupons are distributed through water/sewer bills, the curbside newsletter and neighborhood newsletters.

The Boy Scouts of America in partnership with Clark County coordinate a large community project involving 50 scout troops, 1500 scout and adult volunteers, and 20 businesses and public agencies. The County's solid waste program serves as central coordinator. The Boy Scouts collect approximately 20,000 trees each holiday season. Generally the event is held the Saturday following Christmas.

In the spring and fall, recognized neighborhood associations can arrange for a County crew set up a chipper at a neighborhood site to chip brush and debris for four hours on a scheduled Saturday. County solid waste staff coordinates the date/time/location with the neighborhood site coordinator and prints flyers for the neighborhood to distribute.

Rural Residential Yard Debris

Rural yard debris is often managed very differently from urban yard debris. Large lot sizes and different attitudes result in different management methods such as burning and backyard composting. Self-hauling is done to some degree, particularly in the

denser areas close to the Urban Growth Boundary. No residential collection services for organic wastes are offered in rural areas.

Non-Residential Yard Debris

There is currently no tracking or data collection mechanism in place for non-residential yard debris collection in Clark County. Only data from those businesses that subscribe to yard debris collection services, as described under urban residential services, can be counted. Some large institutional generators of yard debris, such as schools, cities, parks, may self-haul their yard debris to centralized facilities, or, in some cases, practice on-site composting. Businesses often have yard maintenance services that haul the debris to composting operations.

Needs and Opportunities – Yard Debris

Opportunities for co-collection, such as collection of garbage or food waste and yard debris in separate compartments of one vehicle, could be further explored when County or city collection contracts expire or are renewed. Changes in the collection system might lower the cost of collection and/or allow more efficient collection of additional materials. In order to co-collect residential food waste with yard debris, expanding yard debris collection to all residential garbage customers in the Urban Growth Area with the option of weekly collection could be considered.

In 1994 the last phase of the outdoor burn ban took effect covering the southern portion of Clark County. This area, called “the non attainment” area, expands beyond the yard debris subscription area. Expanding subscription-based yard debris collection service to all households within the burn ban area may be a necessary option for this area. Approximately 1200 households within the burn ban area currently do not have access to the yard debris subscription program.

Modifications to chapter 173-425 WAC “Outdoor Burning” prohibits outdoor burning in Battle Ground and the urban growth area by December 31, 2000. Yard debris collection is available in this area, but currently only 20% of the Battle Ground households participate in the program. Targeted education could promote yard debris collection as a way to comply with the expanded burn ban area. In addition, 173-425 calls for a burn ban for locations within a 15 mile radius of a “municipally-sponsored recycling program for disposal of organic refuse at a cost less than or equal to the median of all County tipping fees in the state.” As Map 13-1 shows, a 15 mile radius around county yard debris processing facilities would expand the burn ban boundary to practically the entire county.

**Map 13-1
Burn Ban Areas**

Discussion of Alternatives – Yard Debris

1. *Review yard debris collection programs to ensure that advancing technologies in commingling and co-collection are pursued to the fullest extent possible to minimize program costs and maximize diversion.*

The opportunity exists to explore potential cost savings due to collecting garbage and yard debris using the same truck. Currently this is not possible because the garbage and yard debris service providers are different. A consideration would be to examine a potential WUTC service level ordinance (SLO) for yard debris curbside collection. If the SLO cost estimate is competitive with existing contract prices it may benefit the County to work with the WUTC “G” certificated hauler to provide yard debris collection at the end of July 31, 2002.

2. *Continue and expand coordination with other agencies for educational and technical assistance programs that offer alternatives to open burning.*

As a result of changes to chapter 173-425 WAC “Outdoor Burning” additional rural locations may be affected by the burn ban. The County should work with SWAPCA to proactively promote alternatives to burning to assist the affected parties. There are several options that could be considered for supplying yard debris management alternatives to these areas. First, the County may want to establish a rural drop-off location where rural generators can drop off source separated brushy and woody materials. Grass clippings and other green yard debris would not be included due to the odor generating potential. Second, curbside collection options for yard debris could be made available in all areas affected by the burn ban non-attainment area. Currently this is not the case. Options include:

Amending the current contract to offer subscription-based curbside collection within the burn ban area. Negotiations will need to take place to determine a fair cost of service. There may be the need for an urban and a rural pricing.

Coordinating with the “G” certificated hauler to provide yard debris service in the burn ban area outside of the contracted service area.

The County, SWAPCA and the hauler could work together on educational efforts in the newly expanded area. Promotional activities may include direct mailing, a collection guide and calendar, development and distribution of brochures and grade school promotional activities. Success of the promotions can be measured by tracking subscription rates in specific areas.

(2) Existing Conditions – Food Waste

Clark County is committed to achieving a 50% recycling rate. Currently the County is recycling approximately 35%, primarily as a result of programs targeting residential households recycle paper, cans, bottles and yard debris; businesses recycling paper

and metals; and transfer station recovery of cardboard, paper and metal. Food waste still remains in the waste stream; County programs have not targeted food waste as a recoverable material. To meet the State and County recycling goal of 50%, food waste programs should be considered.

Food waste is a broad, general term. It includes both “*pre-consumer*” and “*post-consumer*” food waste. For composting purposes, food-contaminated papers that have no recyclable value but are compostable, are often included in with “food waste.” “*Pre-consumer*” food waste refers to materials that have no or low probability of having been exposed to human or other pathogens. Examples include meat scraps from butcher shops, grocery store meat departments, households; vegetable trimmings from produce warehouses, grocery stores, restaurant or household salad prep areas, and excess bakery products.

“*Post-consumer*” food waste refers to organic materials that may or may not have been exposed to human or other pathogens and are regulated more strictly. Examples include plate scrapings, salad or food bar leftovers, contaminated paper towels and tissues. For composting facility purposes, materials listed as pre- and post-consumer are further classified as Type 1 or Type 2 feedstocks (see Definitions section at the beginning of this chapter). Currently, no facilities are permitted in Clark County to handle post-consumer food waste or Type 2 feedstocks.

Pathogen reduction. The composting process must reduce pathogens to numbers that eliminate the danger of transmitting disease through the finished product. Pathogens are disease-causing organisms, including bacteria, viruses, fungi, helminths, and protozoa and are found within living organisms and at background levels in the environment. Healthy humans and animals are immune to pathogens at background levels, but they may be susceptible to disease when pathogens are present in higher quantities. Pathogen destruction is achieved in the composting process by using the Process to Further Reduce Pathogens (PFRP) required by federal regulations. Composting PFRP is defined in the federal regulations (40 CFR Part 503 dated February 19, 1993, Appendix B, item (B) (1)) as maintaining specific temperatures for certain periods of time for different types of composting methods of sewage sludge. While PFRP was originally developed for composting sewage sludges, it has been widely applied to solid waste composting.

Composting is not the only waste diversion option of recovered food waste. Some pre-consumer food wastes and food processing by-products can be used by food banks, used for animal feeds or turned into other animal feed products by using processes other than composting.

According to the County’s 1995 waste stream analysis, an estimated 26,700 tons of food waste (11.9 percent of the overall waste stream) are thrown into the garbage each year.

Food scraps can be composted and turned into a soil amendment called compost. Through the Master Composter/Recycler Program, the County actively promotes worm bin composting of food scraps as a waste reduction method. Vermicomposting (using worms to compost food scraps) avoids the economic and environmental costs of operating collection systems and centralized processing facilities.

Residential Food Waste

Currently there is no residential collection of food waste. Some homes compost food scraps in their backyard using worm bins, compost bins or incorporating the food waste directly into trenches in their gardens. Other households dispose of food waste down sink garbage disposals or in the garbage can.

Non-Residential Food Waste

Commercial food waste includes organic grocery debris (unsalable fruits and vegetables, vegetative trim, wax coated cardboard), restaurant organics (food prep, table scraps, soiled and non-recyclable paper), and food processing wastes. Businesses dispose of food waste in a variety of ways: donating to food banks, down garbage disposals, through rendering services, to farmers for animal feed, or to processors for animal feed production.

There are several examples of businesses trying alternative methods to handle their food wastes. Four Vancouver area Safeway stores palletize and return their food waste to the company's Clackamas County, Oregon distribution center. The food waste is then compacted and trucked to Eastern Oregon where it is composted in windrows. Currently the compost is used on location or given to local residents, however the composter has talked about developing a marketing plan to sell the compost.

Fred Meyers participates in a Portland Metro vermicomposting pilot project. This system utilizes a raised vermicomposting bed measuring 128 feet in length, 8 feet wide and is 3 feet deep to process pre-consumer food waste from several Fred Meyer grocery stores. The end product of "worm castings" are bagged and sold through Fred Meyer nursery outlets.

Engineering designs for the new Clark County work release jail include installation of two Earth Tubs to compost 150 pounds per day of kitchen prep waste. The goal of this project is to determine the cost effectiveness of composting food waste on-site. The end compost product will be applied to a 50 by 100-foot jail garden. Onsite handling of food wastes has been successfully implemented in a Washington County, Oregon jail for the past one and a half years.

Frito-Lay Vancouver turns vegetable waste from snack food production into daily staples for cattle. Nearly 45,000 pounds per day of waste from cooking corn and peeling potatoes is processed by Frito-Lay's internal wastewater treatment program into "waste cake." A local farmer picks up three truckloads per day to blend with the regular feed for a herd of 600 cattle. The waste reduction program saves the company

\$174,000 per year in avoided wastewater treatment costs. (Note: The Department of Agriculture reported twenty-three licensed food processors for Clark County. The processors range from small donut shops to packing companies and regional distributors.)

Needs and Opportunities – Food Waste

The County currently lacks a permitted processing facility to handle Type 2 feedstocks and post-consumer food wastes. Given the need for a greater level of odor and health control than provided by open windrow composting, the use of an enclosed facility or an in-vessel process should be encouraged. This will significantly increase facility capital costs. Vermicomposting may provide a cheaper alternative because it does not require large capital investments. With proper care, vermicomposting does not attract rodents or fruit flies, is relatively odor-free and involves almost no noise. The drawback to vermicomposting is the limited amount of tonnage that can be processed.

Residential Food Waste

Post-consumer food organic wastes collection is more common in Canada and Europe, where composting is viewed as a diversion method unconstrained by sometimes unstable and/or distant commodity markets. Canadian food organic wastes collection programs generally recover between 6 and 8 kilograms (13 to 18 pounds) per household per week. It should be noted that a percentage of this recovery is mixed waste paper, such as boxboard, that is used to bulk food wastes and retain liquids. Recovery in areas with mixed paper recycling programs would be lower. If a Clark County urban area residential organic wastes collection program were fully implemented, a total organic wastes stream of approximately 25,000-30,000 tons could be recovered. King County conducted a residential food waste collection pilot project during the fall of 1996. Costs estimates indicate that the least expensive way to collect residential food is from only yard waste customers who would place their food waste directly in their yard waste container. Clark County could consider incorporating food waste collection scenarios in the next yard debris contract to begin August 1, 2002, unless the current contract is extended (two 1-year extensions possible) or if no processing options exist.

Non-Residential Food Waste

Non-Residential food waste includes food and non-recyclable paper wastes from: grocery stores, school cafeterias, hospitals, large businesses with cafeterias, prisons, restaurants, caterers, bakeries, processed food manufacturers, etc. Due to the large quantities of organic wastes generated by food-specific businesses, there is a potential that a portion of the food waste could be economically collected and diverted to composting. Food waste collection programs should initially focus on non-residential food waste recovery. Targeted programs for these sectors would yield the highest diversion at the lower cost. Solid waste staff should identify and survey restaurants, groceries and institutions to determine the quantities of organic waste and the most efficient, economic and environmental way to handle that waste. In regards to food processors, solid waste program staff could conduct a survey to determine the type of

processing waste and how it is currently handled. Site visits and waste analysis should be offered.

Discussion of Alternatives – Food Waste

3. *Evaluate food waste collection and processing to meet recycling and diversion targets.*

Residential Food Waste

The evaluation of implementing residential food waste collection programs will include an assessment of availability and costs of specialized composting capacity, household containerization requirements and the degree of change to existing collection systems required to implement food waste recovery. Several barriers exist to implementing this type of program in Clark County. Collection systems could be significantly changed, with household containers provided to each residence. Successful organic wastes collection programs often use alternating week collection, with organic wastes collected one week and residential wastes collected the next week. This represents a substantial change from the solid waste collection systems known and expected by residents. Garbage and organic wastes (either all organics or yard debris only) could also be co-collected weekly by a split packer truck, however, these two waste streams (garbage and yard debris) are currently collected by two separate collection companies. Co-collection results in the two materials being dumped at the same end-location, which could require reloading and transport of the organics to another location for composting. Finally, the successful implementation of organic wastes collection requires an intensive education effort far beyond that required to implement user-pay curbside recycling.

Non-Residential Food Waste

Non-residential food waste diversion will continue to be encouraged, where appropriate, by County technical assistance programs and private collection companies. Table 13-3 examines possible alternatives to landfilling food waste.

Table 13-3 Alternatives to Landfilling Food Waste	
Food Donations	Nonperishable and unspoiled perishable food can be donated to food banks, soup kitchens, shelters, and other charitable organizations.
Animal Feed	Some types of food discards, such as inedible produce, can be used directly as animal feed. Other types such as baked goods can be converted into a high-quality pelletized poultry food.
Rendering	Meat products and cooking oils can be used in the rendering industry and converted into animal food, cosmetics, soap, and other products.
Composting	This method offers a range of options, from aerated windrows, where organic wastes are formed into long piles, to in-vessel composting, where waste is enclosed in a temperature and moisture-controlled chamber, to vermicomposting, which uses worms to break down materials. Table 13-4 further examines these options.

4. *Encourage the private sector to establish additional processing capacity to process Type 2 organic feedstocks (such as biosolids, post-consumer source separated food waste, and meats) if economics and regulatory climate allow.*

To promote the concept of composting food waste on site with a small-containerized mixing machine, the County may consider providing a rebate incentive or no interest loans to individual food businesses that purchase and operate an in-vessel composter. These options may provide the incentive to purchase on-site composting systems.

Information on food processing facilities could be compiled in cooperation with the Southwest Washington Health District and the Department of Agriculture. An analysis would then be performed to see if processing waste handling methods are most cost effective and environmentally sound. Programs based on economic incentives should be offered.

Note: Local health departments have the authority to decide how food waste composting systems are regulated under the Minimum Functional Standards for Solid Waste Handling, Chapter 173-304 WAC, or under a local solid waste ordinance.

<p>Table 13-4</p> <p>Existing Technologies to Compost Food Waste</p>	
Technology	Remarks
Windrows	Not recommended for handling post-consumer food wastes or Type 2 feedstocks.
In-Vessel (containerized) – on-site small scale	Capable of handling small amounts of food wastes. The site employees need to understand that proper composting of food scraps requires a scientific approach. A responsible employee will need to track and record the amount of food put in each day, the temperature of the system, the proper bulking mix, etc., in addition to feeding the system.
In-Vessel (containerized) – commercially permitted, large scale	A typical in-vessel composting system is a portable unit, designed to biodegrade feedstocks in batches. It consists of a composting compartment that has forced aeration, leachate collection, and usually some kind of air emissions control device, such as a biofilter, attached to it. Feedstock materials are pre-mixed and loaded into the composting container where they are allowed to compost for a specific amount of time. 25 tons per day of pre and post-consumer food waste can be composted in fifteen 40-cubic yard in-vessel units. In-vessel composting systems regulate heat, moisture and air volume to rapidly decompose organic wastes. Odors are fully controlled using biofilters and since the vessels are enclosed, there are no vermin, no groundwater contamination and no leachate problems.
Vermicomposting (earthworms) – commercial 100 foot continuous flow reactors	A raised vermicomposting bed measuring over 100 feet in length, 8 feet wide and is 3 feet deep costs \$50,000 to construct including the cost of one ton of worms. A gantry feeder, riding on rails fixed to the top of the plywood sides feeds the worms up to 6000 pounds (3 tons) per day. A chain-driven breaker bar mechanically scrapes vermicompost from the raised mesh floor, allowing the finished material to fall off the floor under the unit. A recovery scraper then moves the vermicompost from one end of the reactor for collection at the other end. Vermicomposting systems must be maintained at temperatures below 35°C and moisture content between 70 and 90 percent. Thus careful management of the wastes is required. Because earthworms consume organic material in a relatively narrow aerobic layer of six to nine inches, the key to successful vermicomposting lies in adding organic wastes to the surface in successive, thin layers at frequent intervals, so that any thermophilic heating that occurs does not become excessive. Earthworms are very sensitive to ammonia, salts and certain other chemicals and die when exposed to wastes containing more than 0.5 milligrams of ammonia per gram of waste or more than 0.5 percent salts. However ammonia and salts can be washed out of organic wastes or dispersed through precomposting.
Bioconversion	A model plant is in operation on Mitchell Island in Vancouver, BC. The fully contained plant can process 400 tons per day of food waste with the end product sold as a fertilizer ingredient or as a livestock feed supplement. The system has a total processing time of less than 30 hours and can be located in urban industrial parks near the source of raw materials. A wide array of organic wastes can be processed including food waste, sewage biosolids and animal wastes from intensive livestock production units. The plant site, less than 1.5 acres in size, includes a 600-ton per day plant, a truck weigh scale, and truck turning area and vehicle parking.

(3) Existing Conditions – Land Clearing Debris

Land clearing wastes contain natural vegetation and earthen materials from land clearing and grubbing activities usually associated with construction and agricultural development. Land clearing debris sometimes becomes mixed with, or, contaminated by demolition and other waste materials present on the site that is being cleared. For the purposes of this Plan, land clearing waste includes stumps; brush; vines; tree branches; mud; soil; sod; rocks; boulders and similar materials.

Prior to the early 1990s, woody land clearing wastes were either landfilled or burned. However, the burning of land clearing wood wastes is now severely restricted in the southern portion of Clark County. Burning of land clearing wood wastes in the more rural northern parts of the county is currently allowed under certain conditions. Increasingly land clearing waste is either ground and distributed as mulch on-site or trucked to local or regional wood waste processors, particularly in the more urban areas of the county. Land clearing wastes that can be chipped for mulch or composting include wood, brush, tree branches and stumps. Several public agencies and private developers are already doing this. Wood and vegetation can be composted or shredded for hog fuel, wood pellets or ground cover, using specialized chipping and shredding equipment. Stumps and large bulky wood materials present special handling problems. Land clearing debris is accepted at H&H Wood Recyclers for \$8 per cubic yard.

The inert material, especially soil, is typically recovered or left on-site as topsoil and fill.

Tree and plant salvage is a relatively new activity. Clark Public Utilities will work with developers and builders to re-establish firs, cedars or native deciduous trees and other native plants. The developer or builder needs to dig out the trees and the utility company will transport the trees off-site. Live trees and plants will be planted along stream banks to shade the streams and lower water temperatures and prevent stream bank erosion– both essential components of salmon habitat restoration.

Needs and Opportunities - Land Clearing Debris

Revisions to WAC 173-304 may prohibit the burning of land clearing in parts of North Clark County. The affected areas will have a need for alternative disposal methods including drop-off or chipping options (discussed in Yard Debris section).

Discussion of Alternatives - Land Clearing Debris

See Yard Debris Section under Rural Residential Yard Debris.

(4) Existing Conditions – Biosolids

Biosolids are not regulated as part of the solid waste stream, but can be an acceptable feedstock for composting at a facility that has met solid waste permitting requirements.

Table 13-5 shows the amount of biosolids generated by Clark County wastewater treatment plants.

Table 13-5 Clark County Treatment Plant Information		
Treatment Plant	1998 Annual Volume of Biosolids	Utilization Method
Salmon Creek Waste Water Treatment Plant	720 Metric Tons (Dry Weight)	Land Application (Peterson & Smith Farm Sites)
City of Camas	1 million* gallons per year (2.5% solids)	Land Application
City of La Center	259,000 gallons per year (5.1% solids)	Sent to Woodland lagoon then spread on farms
City of Ridgefield	400,000 gallons per year (2% solids)	Liquid applied on tree farm
City of Vancouver (Westside and Marine Park)	10,930 tons of solids per year (based on 30 tons per day)	2,200 tons of incinerator ash disposed at landfill.
City of Washougal	1 million gallons per year (3% solids)	Liquid applied on acre industrial site owned by Port of Camas/Washougal.
* City of Camas estimated based on 5 months of data sent to Salmon Creek Wastewater Treatment Plant.		
Note: Salmon Creek Wastewater Treatment Plant processes wastewater from Battle Ground and unincorporated areas of the County.		

The City of Vancouver incinerates biosolids and the resulting ash is landfilled. Both Ridgefield and Washougal apply most of their biosolids in dewatered (liquid) form to forest and industrial land. Dewatered biosolids from Salmon Creek and Camas are land applied on local farms. The Salmon Creek Treatment plant is involved in a vermicomposting pilot project to determine if the process is suitable to stabilize biosolids to a Class A pathogen standard, as defined by the EPA's 40 CFR Part 503 regulations. Recent studies indicate that biosolids that have passed through the digestive system of earthworms meet the criteria for fecal coliform, Salmonella spp., enteric virus and viable helminth ova levels as specified by 40 CFR Part 503.

Needs and Opportunities - Biosolids

Any compost facility incorporating biosolids as a feedstock is subject to the State's requirements in Chapter 173-308 WAC, Biosolids Management. This includes keeping records, maintaining proper temperatures and duration of composting for pathogen control and vector attraction reduction, and testing the final product. Like its federal counterpart, 40 CFR Part 503, the biosolids rule is self-implementing. This means that the basic requirements of the rule must be met regardless of the permit status of a facility.

Several management alternatives are available for the treatment and disposal of biosolids. These include:

Composting, either alone or with other organic wastes, such as wood waste, yard debris and/or food wastes;

Land application of biosolids onto certain types of agricultural lands (i.e., ornamental crops and certain food crops);

Silvicultural application of biosolids to forested lands;

Application of biosolids for land reclamation;

Incineration of sludge;

Landfilling of sludge or disposal in a surface impoundment;

Composting biosolids with other organic wastes, such as food waste, could combine two or more potentially troublesome waste streams, simultaneously reducing the amount of waste requiring disposal and producing a useful product. Biosolids composting, using a bulking agent, such as wood chips or yard debris, is being successfully done throughout the Pacific Northwest.

The Tacoma Sewer Utility Operations Division (TSUOD) has had success marketing the Tagro Mix, made from dewatered biosolids, sand and sawdust. Tagro mix, used on residential lawns and gardens is sold for \$5/cubic yard, generating sales of \$100,000 in 1997. Clark County could explore similar higher-end uses for its dewatered biosolids to minimize liability issues and transportation costs stemming from land application. If biosolids from Ridgefield and Washougal are to be diverted to a composting facility, the biosolids will need to be dewatered.

In recent years, efficient and large-scale vermicomposting systems have been developed. The methods range from relatively low-technology systems that use manual loading and collection methods to large (128 feet long, 8 feet wide and 3 feet deep) completely automated and hydraulically driven, continuous flow reactors. Labor requirements are minimal and the cost of the reactor is recouped in one to three years. A 1,000-ton-per-year reactor can be built for \$25,000 - \$50,000. In addition to savings from avoided waste disposal costs (land application or landfilling costs), the economics of vermicomposting become even more attractive if the process produces a value-added horticultural plant growth medium with considerable commercial value. Extensive plant-growth trials at Ohio State University have shown that substituting vermicompost for 10 to 20 percent of the best horticultural plant growth media increased rates of germination, growth, flowering and fruiting of a wide range of ornamental and vegetable crops. Clark County, WSU Cooperative Extension and the Salmon Creek Treatment Plant have successfully tested the feasibility of feeding biosolids to *Eisenia fetida* (red worms) with the resulting vermicastings meeting Class A standards for compost.

If the current pilot proves successful, the project could be expanded to a large-scale vermicomposting system. In addition, the County will remain open to possible new technologies.

Discussion of Alternatives - Biosolids

5. *Support the request for delegation of authority to the Health District, or other appropriate local agencies that would give priority to health concerns in the regulation of biosolids utilization.*

The State biosolids rule was adopted in February of 1998. The rule took biosolids out of the solid waste stream and removed it from the regulatory authority of the local health district and into another regulatory structure administered by the State Department of Ecology. Jurisdictional health departments may still be actively involved in regulating biosolids under the State program if they have received delegation of authority from Ecology. Because of past experiences with biosolids applications in Clark County, there is some concern about the ability of a state agency to satisfactorily regulate local occurrences. The SWAC has expressed a preference for local agency regulation of biosolids.

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(5) Existing Conditions – Agricultural Wastes

Agricultural wastes are regulated in Washington under WAC 173-304 and in Oregon under OAR94-040. Most agriculture waste generated in Clark County never enters the MSW stream, it is most often disposed on-site. There is limited data on the specific types and quantities of livestock that produce wastes or on the farm acreage and crops being cultivated in the county and cities. The three principal methods for disposing of agricultural wastes on-site are:

land application (manure and crop residue);

burning (trimmings and crop residue);

use as animal feed (crop residue).

Manure can be land-applied in two ways. It can be left in the field where it was produced by grazing animals, or as in the case of dairy farms and stockyards, large amounts of manure are collected and temporarily stored before land application. However, limited storage capacity often results in the manure being prematurely applied to the land in wet weather, when the ground surface is saturated. These conditions inhibit absorption of the manure into the soils and increase the chances for runoff into surface waters. Manure-contaminated runoff can spread pathogens and degrade water quality by adding excess nutrients. Generally, a dairy farm that discharges manure or contaminated runoff to rivers, lakes, marine waters or groundwater more frequently than during extreme weather conditions is required to obtain a permit. The federal Clean Water Act and 1998 Dairy Nutrient Management act both require dairy farms discharging pollutants to obtain a dairy waste permit from Ecology.

Concentrated Area Feed Lots (CAFL), which generate large amounts of manure in a small area, will be subject to a new set of rules from EPA.

The United States Department of Agriculture (USDA) reports that there are 47 dairy farms in Clark County, with 5,447 milk cows (1997 Census of Agriculture – County Data). This dairy herd population is estimated to produce approximately 70,000 tons of manure annually. Currently, more manure appears to be generated in Clark County

during certain times of the year than is able to be properly stored or land applied. As a result, poor management and improper land application of manure appear to have resulted in elevated levels of nitrates in some surface waters and groundwater adjacent to agricultural lands. Table 13-6 shows the typical amount of manure produced by various animals.

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**Table 13-6
Manure Generation Rates**

Animal	Number of Animals	Volume of Manure (cubic feet per animal per day)	Total Wet Weight (pounds per animal per day)
Dairy cows	5,447	1.10	70
Beef cattle	5,332	0.74	50
Swine	368 (inventory); 794 (sold)	0.15	10
Sheep/Lambs	1,090	0.09	6
Chickens (egg-laying)	1,868	0.0066	0.4
Broilers	3,113,488	0.002	0.4
Turkeys	NA	0.015	NA

Source: *Management of Farm Animal Wastes*, American Society of Agricultural Engineers Publication SP-0366. USDA, National Agricultural Statistics Service 1997

Crop residue is applied to the land by plowing the residues back into the soil. Burning of crop residues and general farm waste is common throughout the county. Crop residues can also be used as animal feed (silage) and can include corn, grains and field crops. In addition, many crop residues can be an important source of food for birds, waterfowl and small animals. The amount of agricultural waste generated in Clark County is difficult to determine. Most agricultural wastes are currently disposed on-site. Table 13-7 shows the average crop residue yield from typical crop acreages.

**Table 13-7
Crop Residue Yields**

Crop	Crop Residue (tons per acre per year)	Nature of Residue
Field crops (canning tomatoes, sugar beets)	30 (wet weight)	Cull fruit and plant material
Field crops dry	1.6 (dry weight)	Dried plant parts
Truck crops market vegetables	7.5 – 120	Green parts not used
Orchard fruit	2	Pruning
Grains (wheat and grass)	3.5	Straw
Field corn	5.3	Dried stalks

Source: *Handbook of Solid Waste Management*, by David Gordon Wilson. Van Nostrand Reinhold Company.

Needs and Opportunities - Agricultural Wastes

Agricultural waste generators need to be better educated about the risks associated with agriculture-related practices and the disposal techniques and resources available to manage these wastes. Ecology has implemented a water quality control program that requires people involved in certain agriculture-related land use activities, such as dairy farming, to obtain National Pollutant Discharge Elimination System (NPDES) wastewater discharge permits. The wastewater discharge permit requirement became effective in January 1992. The U.S. Natural Resources Conservation Service provides engineering support, management guidelines and technical assistance to dairy farmers who apply for these permits.

There is a need for programs to help farmers compost their own wastes, both for their own economic benefit (including liability) and to protect water resources from contamination. The U.S. Natural Resources Conservation Service and the Washington State Cooperative Extension Corps are available to assist in implementing proper waste management practices in the County and cities. Composting organic material for use on your own farm is exempt from solid waste regulations. On-farm composting requires a solid waste-handling permit when the feedstocks include municipal and/or industrial wastes generated off the farm and the end product is sold or distributed commercially. Dead animals can also be an issue. Depending on the number and/or size of the carcasses, proper disposal options vary (see *Special Wastes* Chapter). Note: the Health Department makes the decision on whether or not a particular operation requires a solid waste-handling permit.

The Department of Ecology does recommend that small farms set up cooperative composting sites which would involve bringing manure and crop residues from one farm to another. In setting up cooperative composting farmers should: limit feedstocks to crop residues and manure; follow design standards promoted by the Natural Resources Conservation Service; and work with local Conservation District personnel. In accordance with RCW 70.94.640, odors from agricultural activities, consistent with good agricultural practices, are exempt from air pollution requirements. Clark County should encourage and support private sector efforts for the continued proper management of agricultural wastes. The County and cities could also support and facilitate efforts to minimize land disposal of these wastes by promoting composting opportunities and by developing new markets for the end products. In addition, local governments could support research and encourage agricultural waste generators to seek grants for implementing innovative handling and disposal methods.

Discussion of Alternatives - Agricultural Wastes

6. Coordinate with other agencies for the continued measurement of agricultural waste.

Other agencies, such as the Dept. of Agriculture and Ecology maintain lists of permits and required data for farms which generate manures and other types of agricultural waste. Additional data collection and measurement by the County may be redundant. Existing permit data may be sufficient for the exploring and implementing innovative handling and utilization methods.

7. Encourage the use of manure and other readily compostable organic agricultural wastes for use in a composting facility.

The County should provide technical assistance and education to support manure and crop reuse and composting. Assistance could include site assessment, permitting, compost recipe development, quality control assistance, feedstock sourcing and assistance in public relations and marketing.

Compost Marketing

Most of the discussion in this chapter has focused on the collection and processing of organic wastes. Recycling and composting is a three-step process: collection; processing; and marketing the new product back to the consumer.

Needs and Opportunities

If the County expects increasing quantities of organic wastes to be collected and processed into compost, it should participate in developing increased markets for the resulting compost products. Compost is a valuable soil amendment with many beneficial uses including:

- Providing organic matter, restoring biological activity;
- Improving soil structure, increasing infiltration and permeability;
- Supplying slow-release nutrients to plants;
- Stabilizing soil pH;
- Suppressing soil-borne diseases and plant pathogens;
- Reducing the need for pesticides and fertilizers;
- Increasing water retention in both clay and sandy soils (compost can hold moisture up to 20 times its weight);
- Removing solids, oils, grease and heavy metals from stormwater runoff;
- Preventing pollutants in storm-water runoff from reaching water sources; and
- Preventing erosion and silting on embankments adjacent to creeks, lakes and rivers.

The Composting Council is close to adopting a national seal of quality assurance for compost products. To qualify, a producer must perform regular tests on the compost (based on quantity of compost produced) according to the Council's manual of testing procedures. In addition, the producer must provide directions for product use.

Currently, compost is marketed locally in Clark County by private compost wholesalers and nurseries. Possible options for the County and cities to stimulate the use of increased amounts of compost include:

- Expanding compost use in road projects and other County and city applications;
- Using compost in controlling erosion as sediment fences and wood fiber hydromulch;
- Promoting the use of compost for application on right-of-ways throughout the County;
- Exploring the practicality of using leaf compost pellets in patented stormwater treatment filters.

Discussion of Alternatives

8. Actively promote compost use and support markets for existing and new compost products.

The Clark County Solid Waste Program coordinates an Organics Recycling Group (ORG) which is made up of public and private partners with the goal of increasing communications as they relate to organic wastes collection, processing and marketing. ORG could oversee a technical study to test the applicability of certain types of composts (composted leaves, street sweepings, vector material, biosolids, 3-way compost, etc.) for use in the Padden Highway Phase III. In addition, ORG should continue to promote the use of compost products for County and City uses including roads, parks drainage, wetland mitigation, etc., as well as promoting the use of compost to the general public.

Recommended Alternatives

The Solid Waste Advisory Commission reviewed the complete list of Alternatives and has recommended the following Alternatives:

- 1. Review yard debris collection programs to ensure that advancing technologies in commingling and co-collection are pursued to the fullest extent possible to minimize program costs and maximize diversion.*
- 2. Continue and expand coordination with other agencies for educational and technical assistance programs that offer alternatives to open burning.*

3. *Evaluate food waste collection and processing to meet recycling and diversion targets.*
4. *Encourage the private sector to establish additional processing capacity to process Type 2 organic feedstocks (such as biosolids, post-consumer source separated food waste and meats) if economics and regulatory climate allow.*
5. *Support the request for delegation of authority to the Health District, or other appropriate local agencies that would give priority to health concerns in the regulation of biosolids utilization.*
6. *Coordinate with other agencies for the continued measurement of agricultural waste.*
7. *Encourage the use of manure and other readily compostable organic agricultural wastes for use in a composting facility.*
8. *Actively promote compost use and support markets for existing and new compost products.*